In re Patent Application of:
TROSA ET AL
Serial No. **10/679,608**
Filed: **OCTOBER 6, 2003**

IN THE CLAIMS:

1. (original) A phase shift apparatus comprising:

a plurality of voltage-controlled analog phase shift elements to which respective input signals are supplied and from which phase-shifted output signals, shifted in phase relative to said input signals in accordance with control voltages supplied to voltage control inputs thereof, are produced;

a multiple voltage supply unit having a plurality of voltage outputs that supply respectively different voltages; and

an interconnect switch network, coupled between said voltage outputs of said multiple voltage supply unit and said voltage control inputs of said plurality of voltage-controlled phase shift elements, and being operative to selectively couple any of said different voltages supplied by said multiple voltage supply unit to said voltage control inputs of any of said plurality of voltage-controlled phase shift elements.

2. (original) The phase shift apparatus according to claim 1, wherein a respective analog phase shift element comprises a ferro-electric phase shift element.

3. (original) The phase shift apparatus according to claim 1, wherein said multiple voltage supply unit comprises a resistor ladder network containing a plurality of resistors coupled between first and second voltage reference terminals and having common connections between respective resistors thereof coupled to said voltage outputs from which said respectively different voltages are supplied.

4. (original) The phase shift apparatus according to claim 3, wherein said first and second voltage reference terminals provide a voltage differential therebetween that is effective to

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produce a prescribed amount of phase shift through a respective one of said voltage-controlled phase shift elements.

5. (original) The phase shift apparatus according to claim 4, wherein said prescribed amount of phase shift corresponds to 360° of phase shift.

6. (currently amended) The phase shift apparatus according to claim 5, wherein the phase shift resolution for a respective one of ~~said phase shift elements~~said voltage controlled analog phase shift elements is defined by the number N of resistors of said resistor ladder network as 360°/N.

7. (currently amended) The phase shift apparatus according to claim 3, wherein said voltage-controlled phase shift elements include phase shift elements that are operative to produce phase shift outputs that are linearly proportional to the control voltages supplied to the voltage control inputs thereof.

8. (original) The phase shift apparatus according to claim 7, wherein said respective resistors of said resistor ladder network are equal valued resistors.

9. (currently amended) The phase shift apparatus according to claim 3, wherein said voltage-controlled phase shift elements include phase shift elements that are operative to produce phase shift outputs that are non-linearly proportional to the control voltages supplied to the voltage control inputs thereof.

10. (original) The phase shift apparatus according to claim 9, wherein said respective resistors of said resistor ladder network are unequal valued resistors.

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11. (currently amended) A method of imparting controlled phase shifts to a plurality input signals so as to produce phase-shifted output signals, that are shifted in phase relative to said input signals, said method comprising the steps of:

(a) coupling said respective ones of said plurality of input signals to respective ones of a plurality of voltage-controlled analog phase shift elements, which are operative to impart prescribed amounts of phase shift to the input signals applied thereto in accordance with control voltages supplied to voltage control inputs thereof;

(b) providing a multiple voltage supply unit having a plurality of voltage outputs from which respectively different voltages are supplied;

(c) coupling an interconnect switch network between each of said voltage outputs of said multiple voltage supply unit and said voltage control inputs of said plurality of voltage-controlled phase shift elements, said interconnect switch network being capable of selectively coupling any of said different voltages supplied by said multiple voltage supply unit to said voltage control inputs of any of said plurality of voltage-controlled phase shift elements; and

(d) controlling the operation of said interconnect switch network so as to couple selected ones of said different ~~voltage~~voltages supplied thereto by said multiple voltage supply unit to voltage control inputs of selected ones of said plurality of voltage-controlled phase shift elements.

12. (original) The method according to claim 11, wherein said multiple voltage supply unit comprises a resistor ladder network containing a plurality of resistors coupled between first and second voltage reference terminals and having common connections between respective resistors thereof coupled to said voltage outputs from which said respectively different voltages

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are supplied.

13. (original) The method according to claim 12, wherein said first and second voltage reference terminals provide a voltage differential therebetween that is effective to produce a prescribed amount of phase shift through a respective one of said voltage-controlled phase shift elements.

14. (original) The method according to claim 13, wherein said prescribed amount of phase shift corresponds to 360° of phase shift.

15. (original) The method according to claim 14, wherein the phase shift resolution for a respective one of said phase shift elements is defined by the number N of resistors of said resistor ladder network as 360°/N.

16. (currently amended) The method according to claim 12, wherein said voltage-controlled phase shift elements include phase shift elements that are operative to produce phase shift outputs that are linearly proportional to the control voltages supplied to the voltage control inputs thereof.

17. (original) The method according to claim 16, wherein said respective resistors of said resistor ladder network are equal valued resistors.

18. (currently amended) The method according to claim 12, wherein said voltage-controlled phase shift elements include phase shift elements that are operative to produce phase shift outputs that are non-linearly proportional to the control voltages supplied to the voltage control inputs thereof.

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19. (original) The method according to claim 18, wherein said respective resistors of said resistor ladder network are unequal valued resistors.

20. (original) The method according to claim 11, wherein a respective analog phase shift element comprises a ferro-electric phase shift element.

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